

Claims:

1. An apparatus for closing a fixed gap in an activity surface, the apparatus comprising a movable tray having an upper surface with the same characteristics as the activity surface and means for guiding the tray into the gap so as to wedge the tray releasably in the gap and thereby to provide a substantially continuous activity surface.  
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2. An apparatus according to Claim 1, wherein the apparatus is arranged to reopen the gap by disengaging the movable tray from the gap and the guiding means is arranged to guide the tray out of the gap away from the activity surface.
3. An apparatus according to Claim 1 or 2, wherein the apparatus is arranged to close or  
10 reopen the gap relatively quickly such that the condition of the activity surface can be changed relatively quickly.
4. An apparatus according to any preceding claim, wherein both the activity surface and the upper surface of the movable tray comprise turfed surfaces.
5. An apparatus according to Claim 4, wherein the turf of both the activity surface and the  
15 movable tray is provided on a layer of topsoil having a minimum depth of 150 mm, such that when tray is wedged in the gap, a continuous layer of topsoil is formed having a minimum depth of 150 mm.
6. An apparatus according to any preceding claim, wherein the upper surface of the movable  
20 tray is arranged to have substantially the same coefficient of deformation as that of the activity surface such that when the tray is wedged in the gap, the resultant continuous activity surface has a substantially uniform coefficient of deformation.
7. An apparatus according to any preceding claim, wherein the movable tray comprises a plurality of movable trays for closing the gap with at least one of the trays being arranged to exert a wedging action in the gap.
- 25 8. An apparatus according to any preceding claim, wherein the guiding means is arranged to exert a substantially horizontal wedging action at edges of the activity surface at the gap and the edges of the tray.

9. An apparatus according to any preceding claim, wherein the guiding means is arranged to exert a substantially vertical wedging action at edges of the activity surface at the gap and the edges of the tray.

5 10. An apparatus according to any preceding claim, wherein the movable tray comprises a base and upstanding side walls, the side walls comprising substantially vertical portions and upper portions provided at an angle to the vertical.

11. An apparatus according to Claim 10, wherein the upper portions are arranged at an acute angle to the vertical.

10 12. An apparatus according to Claim 11, wherein the upper portions are arranged at an angle of around 22 degrees to the vertical.

13. An apparatus according to any of Claims 10 to 12, wherein the tray comprises a liquid drainage grid provided at the base of the tray.

14. An apparatus according to any of Claims 10 to 13, wherein the tray comprises a coarse drainage material.

15 15. An apparatus according to any of Claims 10 to 14, wherein the tray comprises a top soil filling extending beyond the height of the upper portions of the side walls.

16. An apparatus according to any of Claims 10 to 15, wherein the tray further comprises an edging material and a soil filling, the edging material and soil filling being arranged to provide a tray edge which extends beyond the upper portion of the side walls at the same angle to the vertical as the upper portion of the side wall.

20 17. An apparatus according to Claim 16, wherein the edging material extends along the upper portion of the side wall and continues along the same direction as the upper portion for a predetermined distance before being folded back into the soil to anchor the edging material.

18. An apparatus according to Claim 16 or 17, wherein the edging material comprises a porous geotextile or porous plastics sheeting.

19. An apparatus according any preceding claim, wherein the edge profiles of the activity surface at the gap and of the movable tray comprise complimentary wedge shapes as viewed in a vertical plane.

20. An apparatus according any preceding claim, wherein the edge profiles of the activity surface at the gap and of the movable tray comprise complementary wedge shapes as viewed in a horizontal plane.

21. An apparatus according to any preceding claim, wherein the edge profiles of the activity surface at the gap and of the movable tray comprise complementary curved edges as viewed in a horizontal plane.

10 22. An apparatus according to any preceding claim, further comprising a support platform for the movable tray.

23. An apparatus according to Claim 22, wherein the support platform comprises a plurality of diagonal support members arranged in groups, each group being arranged to focus the weight of a region of the tray to a single location.

15 24. An apparatus according to Claim 22 or 23, wherein the support platform houses a movement system for moving the support platform and tray into the gap.

25. An apparatus according to Claim 24, wherein the movement system comprises a set of wheels and the apparatus further comprises a set of guide rails for guiding the tray into the gap.

20 26. An apparatus according to Claim 25, wherein the guide rails are curved.

27. An apparatus according to any of Claims 24 to 26, wherein the movement system comprises means for raising and lowering the platform and tray.

28. An apparatus according to Claim 27 as dependent from Claim 25 or 26, wherein the raising and lowering means comprise a set of hydraulic actuators acting on respective over-centre pivot arms, each over-centre pivot arm being connected to a wheel of the set of wheels.

29. An apparatus according to Claim 28, wherein the raising and lowering means has a independent override means including a back-up pump for enabling the raising and lowering to be effected independently.

5 30. An apparatus according to Claim 28 or 29, wherein the support platform comprises a plurality of support legs for supporting the weight of the tray and platform when the platform is in a lowered condition and from which weight can be transferred to the wheels via the over-centre pivot arms on actuation of the hydraulic actuators to place the platform into a raised condition.

10 31. An apparatus according to Claim 30, wherein each support leg is provided with a 'C' shaped pad for securely engaging the guide rail.

32. An apparatus according to any of Claims 24 to 31, wherein the movement system comprises electric drive motors, the motors being pulse controlled such that the rate of movement and positioning of the platform can be varied and controlled accurately.

15 33. An apparatus according to Claim 32, wherein the movement system further comprises a digital controller for controlling the movement of the platform and tray via the electric drive motors.

20 34. An apparatus according to Claim 33, further comprising proximity markers provided at predetermined distances from ends of travel of the movable platform and tray and the movement system further comprising a proximity marker sensor for detecting the presence of the markers in order to slow down or speed up the movement.

35. An apparatus according to Claim 33 or 34, wherein the raising and lowering means comprises limit switch means for disabling lateral movement of the tray until the tray has been fully raised.

25 36. An apparatus according to any preceding claim, further comprising an alignment system for aligning the edges of the tray with the edges of the activity surface at the gap at one end of the movable tray's travel.

37. An apparatus according to Claim 36, wherein the alignment system comprises alignment wedges provided at fixed locations with respect to the edges of the activity surface at the

gap and guide means interactive with the alignment wedges for locating the platform and tray in a predetermined alignment with the edges of the activity surface at the gap.

38. An apparatus according to Claim 37, wherein the guide means comprise at least one wheeled housing which in use acts to move the platform and tray laterally until the platform is aligned correctly.  
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39. An apparatus according to Claim 38, wherein the guide means comprises a plurality of wheeled housings, the wheeled housings being positioned at opposed ends of the platform for aligning each end in use.
40. An apparatus according to Claim 25 or any of Claims 26 to 39 as dependent on Claim 25,  
10 wherein the width of each of wheel is oversized with respect to the width of the each rail so as to allow relative lateral movement of the platform and tray.
41. An apparatus according to Claim 24 or 25, wherein the movement system comprises hover means disposed at an underside of the platform for creating a fluid cushion and raising the platform off the ground such that it can be moved laterally.  
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42. An apparatus according to Claim 41, the movement system further comprises at least one runway for providing a smooth flat surface for movement of the fluid cushion created by the hover means.
43. An apparatus according to any preceding claim, further comprising winch means connectable to the tray or platform for effecting movement of the same.  
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44. An apparatus according to any preceding claim, wherein the guiding means is arranged to move the tray such that edges of the tray move into engagement with edges of the activity surface at the gap at an angle to the plane in which at least the upper portions of the edges of the activity surface at the gap are provided.  
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45. An apparatus according to any preceding claim, wherein the edges of the activity surface at the gap are provided with a reinforcing wall structure for maintaining the uniformity of the edges of the activity surface.

46. An apparatus according to Claim 45, wherein each edge of the activity surface at the gap further comprises an edging material and a soil filling, the edging material and soil filling being arranged to provide an activity surface edge which extends beyond the upper portion of the reinforcing wall structure side walls.

5 47. An apparatus according to Claim 46, wherein the edging material extends along the upper portion of the reinforcing wall structure and continues along the same direction as the upper portion for a predetermined distance before being folded back into the soil to anchor the edging material.

10 48. An apparatus according to Claim 46 or 47, wherein the edging material comprises a porous geotextile or porous plastics sheeting.

49. An apparatus according to any preceding claim wherein the activity surface comprises a pathway.

15 50. A method of closing a fixed gap in an activity surface, the method comprising providing a movable tray having an upper surface with the same characteristics as the activity surface and guiding the tray into the gap so as to wedge the same releasably in the gap to close the same thereby providing a substantially continuous activity surface.

51. A method according to Claim 50, further comprises opening the gap by disengaging the movable tray from the gap and guiding it away from the activity surface.

20 52. A method according to Claim 51, wherein the steps of closing or reopening the gap are effected relatively quickly such that the condition of the activity surface can be changed relatively quickly.

53. A method according to any of Claims 50 to 52, wherein a plurality of movable trays are provided for closing the gap and the method further comprises at least one of the trays exerting a wedging action in the gap.

25 54. A method according to any of Claims 50 to 53, wherein the guiding step comprises exerting a substantially horizontal wedging action at edges of the activity surface at the gap and of the tray.

55. A method according to any of Claims 50 to 54, wherein the guiding step comprises exerting a substantially vertical wedging action at edges of the activity surface at the gap and of the tray.

56. A method according to any of Claims 50 to 55, wherein the guiding step comprises moving the tray in a substantially curved path into the gap in the activity surface.

57. A method according to any of Claims 50 to 56, wherein the guiding step comprises raising and/or lowering the tray.

10 58. A method according to Claim 57, wherein the raising of the tray comprises transferring weight from a plurality of support legs supporting the weight of the tray when the tray is in a lowered condition to wheels of the tray at ends of over-centre pivot arms by actuating hydraulic actuators attached to other ends of the pivot arms.

59. A method according to Claim 58, further comprising controlling and varying the rate of movement and positioning of the tray by controllably pulsing electric drive motors connected to wheels of the tray.

15 60. A method according to Claim 59, further comprising controlling the movement of the tray via the drive motors using a digital controller.

61. A method according to Claim 59 or 60, further comprising providing proximity markers at predetermined distances from ends of travel of the movable tray and detecting the presence of the markers in order to slow down or speed up the movement.

20 62. A method according to any of Claims 57 to 61, wherein the raising and lowering of the tray comprises disabling lateral movement of the tray until the tray has been fully raised.

63. A method according to any of Claims 50 to 62, further comprising aligning the edges of the tray with the edges of the activity surface at the gap at one end of the movable tray's travel.

25 64. A method according to Claim 63, wherein the aligning step comprises providing alignment wedges at fixed locations with respect to the edges of the activity surface at the

gap and locating the tray in a predetermined alignment with the edges of the activity surface at the gap by interacting guide means on the tray with the alignment wedges.

65. A method according to Claim 63 or 64, wherein the aligning step comprises moving the tray laterally as the tray is being moved into the gap until the tray is aligned correctly at the gap.  
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66. A method according to any of Claims 50 to 65, wherein the guiding step comprises moving the tray such that edges of the tray move into engagement with edges of the gap in the activity surface at an angle to the plane in which at least the upper portions of the edges of the gap are provided.  
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67. A method according to any of Claims 50 to 66, wherein the activity surface comprises a pathway.  
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68. A reconfigurable racetrack crossing comprising an apparatus according to Claim 49.  
69. A method of closing a reconfigurable racetrack crossing, the method comprising a method according to Claim 67.  
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70. A method of reconfigurably joining a first section of an activity surface provided in a movable tray to a second section of the activity surface, the method comprising providing complimentary overlapping edges which are inclined to the vertical on both of the sections of the activity surface, moving the movable tray with the first section into a position adjacent the second section and abutting the first section into contact with the second section along the inclined edge to reconfigurably join the two sections together.  
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71. A method according to Claim 70, wherein the abutting step comprises lowering the first section such that its inclined edge comes into complimentary contact with the inclined edge of the second section.  
72. A method according to Claim 70 or 71, wherein the weight of the first section forms a pressure contact at the inclined edge.  
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73. A method according to any of Claims 70 to 72, wherein the abutting step comprises moving the first section into contact with the second section at an angle to the plane of at least an upper portion of the inclined complementary edge of the second section.

5 74. A method according to any of Claims 70 to 73, further comprising providing a third section of the activity surface at a spaced apart location from the second section, and arranging the first section to fill the gap between the second and the third sections when engaged with these sections.

10 75. A method according to Claim 74, further comprising providing the first section with a plurality of inclined edges for engagement with complementary inclined edges of the second section and the spaced-apart third section.

76. A method according to any Claims 70 to 75, further comprising disassembling the first section from the second section by raising the first section to separate the same from the second section along the inclined edges and thereafter moving the raised first section away from the second section.

15 77. A reconfigurable activity surface comprising a plurality of sections, a first one of the sections being provided in a movable tray that can be moved into engagement with a second one of the sections to form at least a portion of the activity surface, the first section comprising an overlapping edge which is inclined to the vertical and complimentary with a corresponding edge of the second section, such that the first section can be joined to be 20 apparently seamless with the second section.

78. A reconfigurable activity surface according to Claim 77, wherein only upper portions of the edge of the first section and the second section are inclined to the vertical.

79. A method of reconfigurably assembling an activity surface in a stadium, the method comprising a method according to any of Claims 70 to 76.

25 80. An activity pitch provided in a stadium, the pitch comprising an activity surface according to Claim 78 or 79.

81. An activity pitch according to Claim 80, wherein the pitch is turfed.

82. A reconfigurable tray moving apparatus for constructing part of a reconfigurable activity surface, the apparatus comprising a set of guide rails and at least one tray providing part of the activity surface, which is movable on the rails, the apparatus further comprising means for moving the at least one tray laterally with respect to the direction of travel of the tray on the rails in order to effect alignment of the tray with an edge of the activity surface.

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83. An apparatus according to Claim 82, wherein the lateral moving means comprises a set of wheels, each set having wheels oversized in width in relation to the width of the rails, thereby allowing relative lateral movement between the wheel and the rail.

84. An apparatus according to Claim 82 or 83, wherein the lateral moving means comprises a secured alignment means positionable at a predetermined position with respect to the edge of the activity surface and guide means providable on the movable tray to co-operate with the alignment means to align the movable tray with the edge of the activity surface prior to secure engagement therewith.

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85. An apparatus according to Claim 84, wherein the secured alignment means is provided at two locations corresponding to the respective positions of the ends of the tray along the direction of travel at engagement with the edge of the activity surface.

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86. An apparatus according to Claim 84 or 85, wherein the guide means comprises adjustment means for adjusting the relative position of the guide means to the tray.

87. An apparatus according to any of Claims 84 to 86, the alignment means comprises an elongate wedge and the guide means comprises a wheeled assembly for engaging the elongate wedge to effect said lateral alignment.

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88. A reconfigurable movable tray apparatus comprising a plurality of movable trays each providing a part of an activity surface and a set of guide rails wherein the trays are provided with engaging wheels which enable the trays to be movable on the guide rails to a desired coupling position and be securely located at the coupling position by transferring the weight of the tray from the guide wheels to fixed support means of the tray.

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89. An apparatus according to Claim 88, wherein the apparatus is arranged to transfer the weight from the fixed support means of the movable tray to the guide wheels at the secure

coupling position prior to moving the tray on the guide rails via the wheels to another position away from the coupling position.

5 90. An apparatus according to Claim 88 or 89, wherein each tray comprises a plurality of over-centre pivot arms each connected at one end to a guide wheel and having a hydraulic actuator provided at the other end, the over-centre pivot arms being arranged to be movable between two positions in order to effect the transfer of the weight.

10 91. An apparatus according to Claim 90, wherein each of the hydraulic actuators is controlled by a hydraulic power means which circulates hydraulic fluid to each actuator.

92. An apparatus according to Claim 91, wherein a flow divider means is provided for dividing the hydraulic fluid evenly between the hydraulic actuators to effect simultaneous and even actuation of the hydraulic actuators.

15 93. A replaceable section of an activity surface, the section being provided on a movable reconfigurable tray and being arranged to disengage the activity surface and be moved away therefrom to be replaced by another section of the activity surface provided on the movable tray.

94. A section according to Claim 93, wherein the activity surface comprises a pathway.

95. A section according to Claim 93 or 94, wherein the activity surface is a part of a turfed playing field.

96. A section according to Claim 95, wherein the activity surface is provided in a stadium.

20 97. A section according to any of Claims 93 to 96, wherein the activity surface has regions which wear at different rates and the replaceable section is provided in a region of excessive wear.

98. A section according to any of Claims 93 to 97, wherein the movable tray is arranged to engage its edges with corresponding edges of the activity surface at an angle to the plane in which at least the upper portions of the edges of the activity surface are provided.

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99. A section according to any of Claims 93 to 98, wherein the movable tray is circular in shape and the section is moved away from the activity surface by being rotated about the centre of the tray.

100. A section according to any of Claims 93 to 99, wherein the tray is movable on rails.

5 101. A racetrack comprising a section according to any of Claims 93 to 100.

102. A sports activity pitch comprising a section according to any of Claims 93 to 101.

103. A movable reconfigurable tray for providing replaceable sections of an activity surface, the movable tray comprising first and second sections compatible with and engageable with the activity surface, the movable tray being arranged to replace the first section by the second section when the first section has become worn.